

Evaluation of Life Sciences 2022-2024

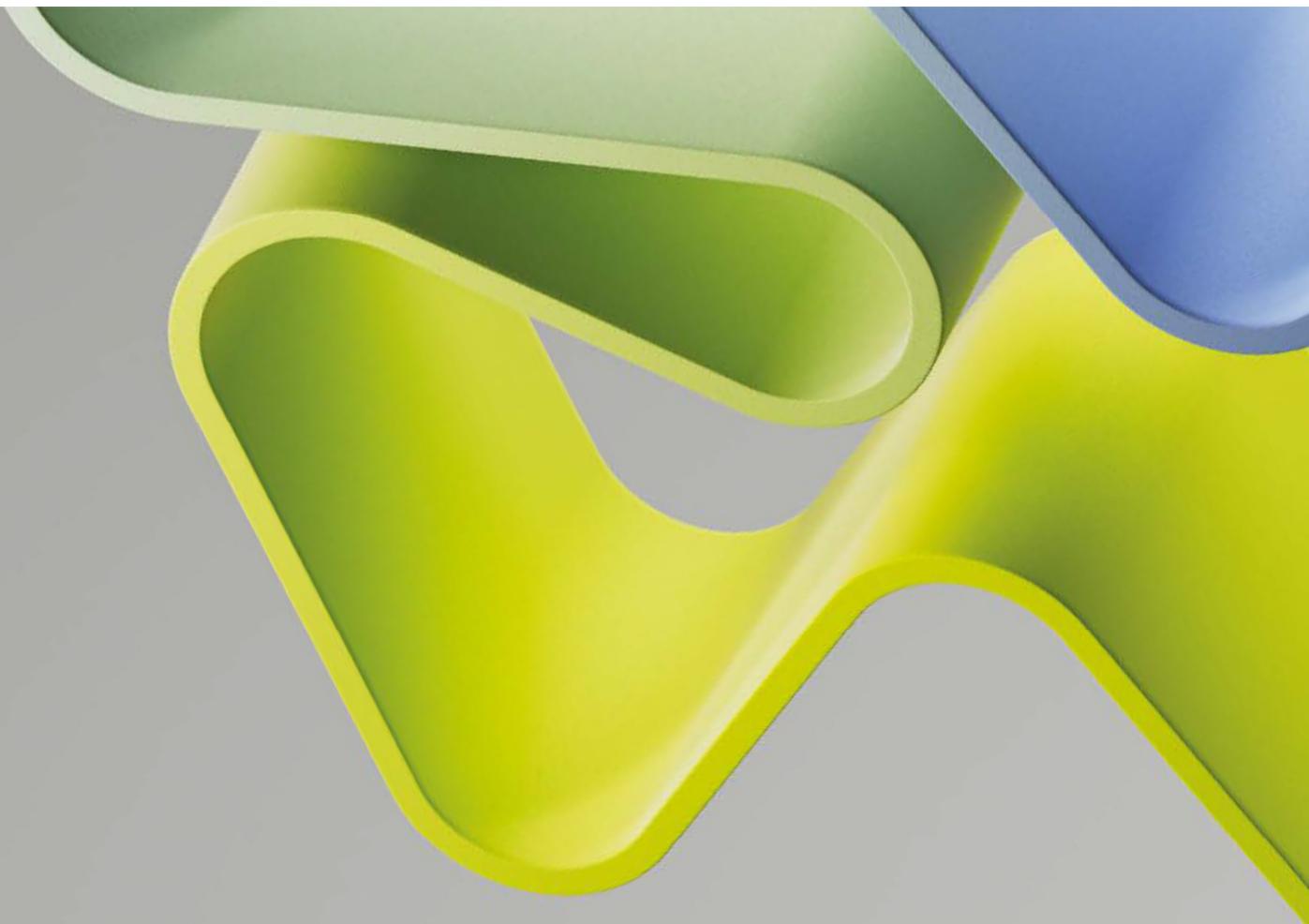
Evaluation of Biosciences 2022-2023

Evaluation report

Faculty of Biosciences (BIOVIT)

Norwegian University of Life Sciences (NMBU)

December 2023



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Statement from Evaluation Committee 2

This report is from Evaluation Committee 2 which evaluated the following administrative units representing the higher education sector in the Evaluation of Biosciences 2022-2023:

- Faculty of Bioscience (BIOVIT), Norwegian University of Life Sciences (NMBU)
- Faculty of Chemistry, Biotechnology and Food Science (KBM), NMBU
- Faculty of Biosciences and Aquaculture (FBA), Nord University (Nord)
- Department of Biotechnology and Food Science (IBT), Norwegian University of Science and Technology (NTNU)
- Computational Biology Administrative unit (CBU), University of Bergen (UiB)
- Department of biological sciences (BIO), UiB
- Department of Biosciences (IBV), University of Oslo (UiO)
- Department of Chemistry, Bioscience and Environmental Engineering, University of Stavanger (UiS)
- Faculty of Biosciences, Fisheries and Economics (BFE), University of Tromsø – The Arctic University of Norway (UiT)

The conclusions and recommendations in this report are based on information from the administrative units (self-assessment), digital meetings with representatives from the administrative units, bibliometric analysis and personnel statistics from the Nordic Institute for Studies of Innovation, Research, and Education (NIFU) and Statistics Norway (SSB), and selected data from Studiebarometeret and the National Teacher Survey (Norwegian Agency for Quality Assurance in Education [NOKUT]). The digital interviews took place in Autumn 2023.

This report is the consensus view from committee 2. All members of the committee have agreed with the assessments, conclusions and recommendations presented here.

Evaluation committee 2 consisted of the following members:

Professor/Dean
Ivo Sbalzarini (chair),
TUD Dresden University of Technology
& Max Planck Institute of Molecular
Cell Biology and Genetics

Professor
Caroline Austin,
Newcastle University

Professor/Pro-Dean
Ade Whitehouse,
University of Leeds

Professor/Deputy Dean
Lena Mäler,
Stockholm University

EM. Professor/Director
Nico P.E. Vermeulen,
Vrije Universiteit Amsterdam

EM. Professor/Director
Lene Lange,
Technical University Denmark

Adjunct Professor, dr.
Pikka Jokelainen,
Statens Serum Institut

Dr Anoushka Davé, Principal Consultant, Technopolis Group, was the committee secretary.

Oslo, December 2023

Profile of the administrative unit

In 2021, the Faculty of Bioscience (BIOVIT) had a total of 243 employees, out of which 29 were professors, 14 associate professors, 46 researchers, 17 postdocs and 44 PhD students. 33 PhD students were employed elsewhere. The majority of postdocs and PhD students employed elsewhere were women. 41 percent of the professors were women, and women also represented a minority of associate professors and researchers employed by the faculty.

BIOVIT is comprised of eight research groups: Breeding and quantitative genetics, Ruminant Nutrition and Physiology, Nutrition and Physiology in Monogastric Animals, Ethology and Animal Environment, Genome Biology, Genetics and Plant Breeding, Plant Biology and Plant Biotechnology, and Plant Protection and Food Crops.

BIOVIT's self-assessment indicates that the administrative unit's priorities are set in the strategy/action plans developed by the faculty. The new strategic action plan is aligned with the recently drafted NMBU strategic plan. In the next three years the administrative unit aims to strengthen its expertise and capacity in systems thinking, transdisciplinarity, digitalisation, artificial intelligence and automation. According to the self-assessment, BIOVIT's main research and innovation fields are basic and applied biology. BIOVIT also wishes to maximise synergies between research and teaching. Students' research projects and study programmes are in strategic research areas as outlined in the administrative unit's strategy.

As a higher education institution (HEI), BIOVIT strives to follow the four overall goals for HEIs that receive public funding: high quality in research and education; research and education for welfare, value creation and innovation; access to education (esp. capacity in health and teacher education); and efficiency, diversity, and solidity of the higher education sector and research system. According to the self-assessment, BIOVIT's research and education covers the areas of food production, agriculture/aquaculture, and the biological basis for the aforementioned areas. The research is aimed at tackling challenges and tasks relevant to the industry, public sector, schools and education. Researchers at the faculty collaborate with industry, and the results from the research are often quickly adopted by industry. The teaching is research-based. Master's students can choose internships in plant science, animal science, aquaculture, feed technology, or urban agriculture. This often results in master theses with industry partners and collaborations in research projects.

Based on its self-assessment, in the future BIOVIT might take advantage of the faculty's strong scientific groups within animal and plant sciences. For example, the faculty is a national leader in agricultural and aquacultural research (bioproduction). Moreover, the main research areas at the faculty align with the governmental long-term plan research and higher education 2023–2032. The administrative unit aims to focus on sustainability in today's food system and the transition to social, environmental, and economic sustainability.

Overall assessment

The evaluation committee's overall assessment considering the Terms of Reference provided by the Unit is that the Faculty of Biosciences at the Norwegian University of Life Sciences (NMBU-BIOVIT) performs high-quality research in animal and plant genetics, nutrition, and development of sustainable food and feed systems, which are areas of great economic and societal relevance. They span the breadth from basic molecular biology over computational work to product development and field studies. This is impressive and evidenced in some highly cited publications.

The administrative unit aims to be Norway's "sustainability university" and the go-to place for education in food production and agriculture, as well as their biological basis. This goal seems to have been fully achieved, and the administrative unit is well positioned to continue this nationally leading role into the future. The administrative unit has access to unique infrastructures for plant and livestock research, including a research food factory, which provides them with a competitive advantage and makes them an attractive collaboration partner.

The funding situation of these large research infrastructures and of the administrative unit as whole, however, are a point of concern. Increasing personnel and running costs at constant core funding present an existential risk. While the administrative unit has the potential to further increase its (international) external funding, stable running of infrastructures requires core funds. This is something that the administrative unit should consider for future planning.

A second challenge for the administrative unit going forward will be to increase its international visibility, which will make them more competitive in attracting international funding and hire talent. Indeed, hiring seems to be a point of current concern, with declining student numbers and few PhD candidates and postdocs. For this, it will be important that all core resources, i.e., all research groups, contribute. The research groups of the administrative unit were evaluated by an expert panel, and some do not seem to have critical mass to compete for strategic grants. This might require attention.

Overall, the administrative unit has been productive and is particularly relevant to society on the national level, as it is responsible for the majority of higher education in the field of food production. It boasts strong academic and industry collaborations. A particular strength is in hosting external PhD candidates (50% of all PhD candidates) and translating their findings into applications, which has resulted in several important patents. The administrative unit has demonstrated its societal use by contributing towards the goals of sustainability, agriculture, and circular economy in Norway and several UN Sustainable Development Goals (SDGs).

Recommendations

The evaluation committee wishes to extend the following recommendations to the administrative unit, which are constructive suggestions from an outside view on the basis of the information available to the committee and considering the aspects on which recommendations were requested in the terms of reference.

The administrative unit is recommended to:

- Evaluate its group structure and the heterogeneity in research evaluation results, sizes, and topics across groups in order to ensure all resources contribute to the administrative unit's strategic development. For this, it could help to:
 - Create structural incentives for cross-group work, e.g., by reserving some funds for shared projects;
 - Introduce hiring criteria and mentoring schemes or structured programmes for PhD candidates and postdocs at the administrative unit level;
 - Leverage synergy between groups by incentivising cross-group projects, resources, and supervision;
 - Ensure that the large proportion of external PhD candidates are integrated into the research culture, social life, and mentoring structures of the administrative unit;
- Improve its international visibility in order to be more competitive in hiring talent, fight their falling (international) student numbers, and participating in large consortia grants and centres. For this, it could help to:
 - Establish an international scientific advisory board composed of experienced international researchers from academia and industry;
 - Develop (with the help of the advisory board) a coherent research vision and strategy beyond 2023 with a clearly visible profile;
 - Participate in international research infrastructures and organisations or the European Strategy Forum on Research Infrastructures (ESFRI) Roadmap;
 - Increasingly embrace computational and digital methods and collaborate with other places pioneering this;
 - Invest into going the “extra mile” for publishing in visible high-impact journals.
- Develop plans and procedures for ensuring all research data are deposited in NMBU's Open Archive and for reviewing this across groups.
- Develop a digitalisation strategy and consider how to best include the teaching of digital skills into undergraduate curricula, maybe joint with another department or faculty. Digital technology, artificial intelligence (AI), and computational approaches are increasingly key.
- Develop a strategy for how to cope with the changes in the funding environment and integrate with strategic projects of the university.
- Develop a strategy for maintaining and developing infrastructure, including securing funding for this purpose.
- Reconsider teaching load distribution and how to free up time for promising external funding applications, in particular the European Research Council (ERC).
- Capitalise on the societal contributions and importance of the research for sustainability in order to attract more and better people on all levels.

1. Strategy, resources and organisation of research

The administrative unit has a classic university faculty structure with strong independence of the research groups. This provides an efficient administrative structure. It does, however, also bear certain risks with regards to interdisciplinarity, cross-group collaboration, homogeneity of research quality and productivity across groups, and uniform mentoring schemes for early-career researchers. Indeed, the administrative unit seems to be facing some of these challenges. It is important that these are addressed given the extremely high societal and economic relevance of the administrative unit's research. The administrative unit has been productive in both research and teaching and is able to capitalise on a unique research infrastructure. Maintaining this infrastructure on solid financial foundations will be an important challenge, given that core funding is not likely to increase, whereas costs are. The main levers for the administrative unit are to increase its international visibility and ensure all groups contribute on a high-quality level. This is not only going to help them hire talent, which seems to be a current difficulty, but also attract more external funding. Establishing an international scientific advisory board could help provide an outside view and raise visibility. This will also be important to develop the next research strategy of the administrative unit beyond 2023.

1.1 Research Strategy

The currently available research strategy of the administrative unit ended in 2023. It had a strong focus on applied research, which matches well with the actual work at the administrative unit and is in line with current development in the funding opportunities. The administrative unit understands and fulfills its role as a key translational player in the Norwegian primary and circular economy sectors and maintains an impressive array of industry collaborations. A key question therefore is what the research strategy of the administrative unit in the future will be. *This should be worked out as soon as possible now that the overall strategy of NMBU has become available.*

The administrative unit has a clearly visible research focus on animal and plant genetics, nutrition, and development of sustainable food and feed systems. This is based on fundamental research in genetics, biotechnology and physiology focused on organisms used in bioproduction and agriculture. This is important for the transformation of the Norwegian economy, and the administrative unit takes its role seriously, as evidenced by their engagement with authorities and membership in national and international clusters (e.g., Heidner Biocluster, NCE Seafood innovation, Animal Task Force, European Plant Science Organization).

The administrative unit plans to strengthen its research in aquaculture, for which it has established a steering group and allocated additional academic positions. Priorities like this will be of increasing importance in the future in order to secure strategic funding for larger grants/centres which require a strong focus.

1.2 Organisation of research

The administrative unit has a classic university structure with a dean at its helm. This structure is suitable to the type of research the administrative unit performs. The research group leaders are responsible for overseeing the activities in the groups. The 40-40-20% split of time between research, teaching and administration provides a good environment for everybody to work in. Professors and associate professors are responsible for supervising MSc students and PhD candidates, as well as mentoring postdocs and securing external funding.

There seems to be a classic, relatively strong separation of groups with a historically grown structure. There is an opportunity here for the administrative unit to reconsider its group structure. Some groups are rather small and there is significant variation in how the expert panels evaluated the groups. In light of the changing funding landscape, more synergies between the group and more critical mass for attracting large strategic grants will be important. It is equally important that the administrative unit is well networked into the university.

Establishing an international scientific advisory board could help inform the strategic research vision of the administrative unit and the corresponding organisational structure. This could help the administrative unit leverage its excellent national reputation to become more visible internationally and attract talent at all career levels.

1.3 Research funding

The administrative unit has a solid track record of attracting external funding, in particular also from industry. Their external funds stem from both national and international sources. The stated 30-50% of external funds in the overall budget, however, are still relatively low. Given the prediction that core funding will not increase in the coming years, whereas expenses will, shifting this ratio toward more external funding will be important. Enabling the research groups to successfully do so will hinge on the ability of the administrative unit to free up enough of their time, for example by reductions in the teaching load, for successful grant applicants. It is important that every group of the administrative unit contributes its share to attracting external funds and to network and integrate with strategic projects and funds at the university level.

Of special interest are the important large research infrastructures of the administrative unit (e.g., for plant and livestock research as well as the research food factory), for which a solid financial basis must be ensured by all means if the administrative unit is to keep its competitive advantage. This does not completely seem to be the case at the moment and will require attention.

1.4 Use of infrastructures

NMBU hosts Norway's largest research food factory FoodPilotPlant at campus Ås, together with external partners. In addition, they have a research dairy, a brewery, and a bio-refinery. The administrative unit has used FoodPilotPlant together with NMBU-KBM since 2017. The administrative unit is making very good use of these unique research infrastructures and is advised to continue doing so and contribute to strengthening their resourcing.

These own and rather unique research infrastructures are complemented with facilities, such as the Centre for Plant Research in Controlled Climates, the Centre for Sustainable Aquaculture, the Centre for Livestock Experiments, the Centre for Feed Technology, the Imaging Centre, and genomics and sequencing facilities. *Access to these resources constitutes a uniquely strong point that the administrative unit can capitalise on in its research and that should be preserved and further developed.*

In addition, NMBU has been a node in ELIXIR.NO since its inception in 2012. Within this bioinformatics network, the administrative unit benefits from national bioinformatics training and helpdesk services provided by ELIXIR Norway. The NMBU node contributes into ELIXIR the genomic resources for fish. This is outstanding. The administrative unit also makes use of and benefits from the and the NMBU Orion High-Performance Computing (HPC) infrastructure, which is a vital in-house resource for its bioinformatics work and data handling.

1.5 National and international collaboration

Almost all research at the administrative unit is collaborative. 50% of the publication of the administrative unit involved external co-authors (ca. 60% international, 40% national). There seems to be a bias, though, toward collaborating with the same set of partners, and joint publications with researchers in the US and the UK are few. 70% all collaborations involved partners from industry, which is outstanding given the high societal and economic relevance of the administrative unit's research for Norway.

More and stronger links with relevant partners abroad could help strengthen the international visibility of the administrative unit and also enrich the mobility options for students and researchers. Currently, these options seem to be limited to the usual programmes (Marie Curie Actions, ERASMUS+). The international travel grants are a great idea, but they are currently limited to staff with permanent contracts, which is not ideal.

Further contribution to increasing the international visibility of the administrative unit could be to participate in international research consortia or organisations. Currently, the administrative unit does not host any international infrastructure as a leading house. It does, however, participate in one national bioresource and in the Norwegian ELIXIR node (leading house: University of Bergen, Computational Biology Administrative unit), where they develop “salmonbase”. This is a very relevant and commendable effort.

1.6 Research staff

The administrative unit has very successful career development measures for postdocs, offering them a 6-year tenure track to a permanent researcher position. Permanent scientists have 40% of their time for research (40% teaching, 20% administration), those leading large projects 80-100%. This is very good and should make the administrative unit very popular with postdocs. It is therefore surprising that they have so few (17 postdocs, 43 PIs). Indeed, the administrative unit sees it as a threat that there are few qualified applicants for open positions, which may hint at a visibility problem.

The composition of the administrative unit in terms of its research staff seems faculty-heavy, with about the same number of professors (43) as internal PhD candidates (44). This is unusual and could be sign of funding or hiring difficulties. The administrative unit may want to look further into increasing the number of PhD candidates. In addition, the faculty provides academic supervision for 33 PhD candidates employed elsewhere, many in industry, which is very good given the translational potential of the research. A question is how the administrative unit integrates this relatively large proportion of external PhD candidates into its research culture and mentoring mechanisms to develop a sense of community.

Creating an attractive, supportive and inspiring workplace also hinges on the quality and availability of personalised mentoring. It is not clear how PhD candidates, postdocs, and junior PIs are mentored beyond the usual group meetings and progress reports. *It is recommended that the administrative unit makes an investment in this direction, which may also help attract more early-career researchers and equalise the quality across groups.*

2. Research production, quality and integrity

Each of the eight research groups of the administrative unit have been evaluated by an expert panel, whose evaluation summaries and performance marks are included below after a spelling and language check.

The administrative unit is leading nationally in terms of research quality and productivity. It consists of eight research groups that were evaluated by an expert panel, whose evaluation summaries and performance marks are included below. The groups in Genetics & Plant Breeding and Genome Biology rank very high and highest among the administrative unit. Most groups (five out of the eight) are ranked competitive. The group on Plant Protection and Food Crops received the lowest scores but is still rated good.

The administrative unit should pay attention to critical mass in their research topics and to ensuring collaboration and synergy between the groups. Some groups seem rather small and diverse. This makes it challenging to embrace the level of interdisciplinarity required to address the research topics and to partner in large strategic centre grants. The group structure should be evaluated and structural incentives for cross-group facilities (e.g. by providing central funds for shared projects) should be considered to incentivise synergy.

The administrative unit has good productivity (average of >3 publications per PI and year) and their publications are well cited (ca. 10% share in the top 10% most cited papers). Publications spread across journals with general readership, as well as application-specific specialist journals, which is very good.

The administrative unit has guidelines for research integrity in place and made them a mandatory MSc curriculum component. This is very good. The administrative unit also has its own ethics council, which is good standard given the animal-oriented and applied nature of their research.

2.1 Research quality and integrity

Breeding, Genetics and Food Production research group – overall assessment by Expert Panel 4a

The group is relatively small in comparison to other international leading groups working in the same research area. The strength of the group is its close collaboration with these groups as well as the close collaboration which it has with the Norwegian breeding industry. Overall, the research being performed by the group is of good quality, with a steady output of publications. The level of research funding that has been acquired by the group during the assessment period is high, but the level of research outputs does not appear to reflect this high level of funding, which may reflect the lack of detail provided on the outputs to allow such an assessment to be undertaken.

The relatively small size of the group and the breadth of topics (species) the group focusses on, is a potential weakness and it is advised that being more selective could help the group in consolidating their work and in developing greater strengths that could more readily be recognised internationally. It is good that the group aims to contribute to a working group on data sharing in agriculture.

Ethology and Animal Environment research group – overall assessment by Expert Panel 4a

The research group is strongest in the societal dimension, with good stakeholder networks and stakeholder collaboration and active knowledge transfer to society at large. The group is small and has many teaching and administrative responsibilities, which may hamper their ability to attract larger research funding and conduct cutting-edge research. Publications activities are focused on subject-specific scientific communication and broader knowledge transfer. Despite this, the group manages to educate undergraduate and PhD students, and maintain core expertise required to meet the national educational and societal needs.

Genetics and Plant Breeding research group – overall assessment by Expert Panel 4a

This is a very high-quality group with scientific outputs and activities that are commendable, particularly given the size of the group. The organisational dimension of the group was noted to be very strong, and the organisational structure of the administrative unit appears appropriate, with a good culture and a good balance of career stages within the group. Less clear was detail on the strategic vision of the group, which meant that research seemed more reactive than proactive. This was considered to be a relative weakness despite the high-quality work being undertaken. The panel did note that work in macroalgae was a promising focus area for future research, both in terms of scientific value and potential impact.

Both the quality of scientific outputs and impacts are very good, and the level of input from the group to the shape and direction of these are both strong. Of particular note was the research group's contribution to quality publications, which was noted to be excellent and well explained.

Genome Biology research group – overall assessment by Expert Panel 4a

This is an outstanding group who perform very high-quality scientific research and disseminate their scientific outputs in high quality scientific publications. The level of the outputs reflects the fact that the group consists of a critical mass of scientists, with relevant expertise in key disciplines, such as

evolutionary and comparative genomics, genetics, systems biology and bioinformatics. The group provides important data from genotyping studies to breeding companies and programmes. The organisational structure is excellent, and the research strategy is cohesive. The level of funding obtained to support the research activities is impressive and comes from a variety of different sources. The panel were a little concerned that the group may have moved their focus away to some extent from the animal genetics area, which if continued could potentially have a deleterious effect on its future sustainability. While there is some evidence of engagement with the general public, this could be increased, particularly with a view of highlighting the excellent work, of clear socioeconomic importance that the group is currently undertaking.

Nutrition and Physiology of Monogastric Animals research group – overall assessment by Expert Panel 4a

The strength of the group lies in its strong collaborative linkages with industry and through its ability to attract research funding. The group is medium sized with a sufficient number of senior staff to support PhD training and other educational activities. Weaknesses include limited international collaboration and a high dependency on external funding. The group plans to recruit new staff depending on approved project funding.

The researchers in the group appear to undertake their project separately and although interdisciplinary training is emphasised in the self-assessment report, it is not clear if interdisciplinary collaboration within the group has to date been fully explored or indeed optimised. In addition, there is a lack of clarity regarding some additional aspects within the report particularly with respect to scientific outputs and international comparisons, in the quality dimension of the report, making it difficult to assess this dimension.

Plant Biology and Biotechnology research group – overall assessment by Expert Panel 4a

Overall, this is a good quality group, with a steady series of outputs and that provides a supportive environment for researchers. Outputs are of appropriate quality for the type of research being undertaken by the group and appear to make a significant impact related to the needs of the horticulture sector. Therefore, it is at a comparable level to other similar national groups for research quality, and at a good level when compared to international groups for research that has an impact on society or on broader groups.

The group clearly describes opportunities and threats towards future success in terms of how to increase collaborations and build from their current small size. A strategy to best achieve this would help to increase the volume and quality of research, as well as the strength of the role that the group plays in a wide range of outputs.

Plant Protection and Food Crops research group – overall assessment by Expert Panel 4a

Compared to their relatively small size the group is performing well, with quality that is recognised internationally in terms of originality, significance and rigour and a contribution to economic, societal and/or cultural development that is at a level to be expected from similar groups in this research field. Some notable impacts were research papers combining bioinformatic, agronomy and environmental regulation of plant processes to better understand plant quality and plant disease. This work was of a particularly good quality. Some notable societal impacts were related to education and policy, but evidence was less clear in this aspect of the group's activities.

It was less clear to what extent the group have a leading role in the formulation of the research process or the means by which societal impact is realised, but they were noted to play a considerable

role in each. The group clearly describes opportunities and threats towards future success in terms of how to increase collaborations and build from their current small size.

Ruminant Nutrition and Physiology research group – overall assessment by Expert Panel 4a

A strength and also a weakness of the group is the multidisciplinary approaches that it is employing in conducting their research. Integrating different disciplines that are relevant for ruminant feeding and production is very important and increasingly funding agencies dictate that such multidisciplinary approaches are employed in this research area. However, given the modest size of the group care must be taken to maintain sufficient critical mass from within the different disciplines, to ensure its future sustainability.

2.2. Open Science

The administrative unit follows NMBU's policy for Open Science, which has a leading IP retention strategy since 2023. NMBU also provides an open archive for research data, the NMBU Open Research Archive. The administrative unit seems to have requirements for meta-data and storage of research data following FAIR principles (Findable, Accessible, Interoperable, and Reusable) and regularly organises courses since December 2022 to train its researchers. Assistance is available for people to use these archives, which is very good. It was less clear, though, to what extent the group in the administrative unit actually use these archives. This question becomes the more pressing as the administrative unit reports only one dataset from the administrative unit stored at the NMBU Research Data Archive. The administrative unit is recommended to develop plans and procedures for ensuring all research data are deposited and for reviewing this across groups. The administrative unit's current engagement in this regard seems to only go as far as law and regulations require it.

The share of open-access publications has continuously increased over the years as has been >90% since 2020 with self-archiving and Gold Open-Access about half-half. This is very good and on an internationally competitive level.

Importantly, and impressively, the administrative unit has also actively engaged in Citizen Science and Crowdfunding. A study has been conducted with the help of >100 citizens to test growth media for plants in urban environments. This is a great example of how the general public can be engaged in a way that is fun and generates important research data.

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3. Diversity and equality

The administrative unit follows the Plan of Action for Gender Equality, Diversity and Inclusion as well as the Gender Equality Plan of NMBU but does not seem to have their own stipulations or procedures beyond those. They do have very good gender balance, though, among co-authors and in its staff and student body, so this is not a point of concern for them. Remarkably, they nevertheless aim to further increase the proportion of female professors (currently 41% among full professors and 36%

among associate professors), which is commendable. Concrete ideas or plans of how they plan to achieve this were, however, not provided. The currently slightly better sabbatical regulations for female associate professors are likely not enough.

The administrative unit has very good diversity in terms of the internationality of its staff. The proportion of international students, however, decreased from an already low 22% to only 18%. The administrative unit reports challenges with information flow giving its increasingly international staff. They address this by combining English and Norwegian when communicating important information and offering Norwegian language courses to international students and staff, in particular those involved in (Norwegian-language) bachelor's teaching. With research becoming increasingly international, and domestic funding and talent pools limited, it will be an important factor for the administrative unit to work out sustainable schemes that make everyone feel welcome and have a sense of belonging. This will also help them increase their international visibility and attract top students from abroad.

4. Relevance to institutional and sectorial purposes

The administrative unit has achieved its stated goal of being Norway's "sustainability university" and go-to place for education in food production and agriculture, as well as their biological basis. They are very active in translational research and collaborations with industry and hold several important patents, significantly contributing to NMBU's overall institutional agreement with the Ministry of Education and Research of Norway.

The administrative unit is responsible for a large part of higher education in food production. Its research-oriented master's and bachelor's programmes are partly specialised in plant-, livestock-, aquaculture- and biological sciences, and partly inter-disciplinary. At the MSc level, programmes are also offered in English, which helps attract much-needed specialist workforce and provides important education with a global reach. Of particular note are the "Master's Days" held at the administrative unit where students connect with ongoing research and industry partners. Also, BSc and MSc students are integrated into research groups as interns via a special curricular module that allows them to get credits. During this time, the students take part in the life of the research group, including group meetings and presentations, providing them with an excellent hands-on education. This is very good and innovative.

The administrative unit's teaching is important to ensure holistic and sustainable social development. *The declining numbers of (especially international) students are, however, a concern that should be addressed.*

The overall number of PhD candidates in the administrative unit is low by international standards. With only about one (or two, when also counting externally employed ones) PhD candidates per professor, this is clearly a point of concern and could hint at a visibility, financial or recruiting problem.

The administrative unit is particularly strong in industry collaborations, which make up about 70% of their research. Industry partners include many renowned companies, such as Geno, Norsvin, Graminor, AquaGen, Nortura, TINE, and Borregaard. This collaborative and translational character of the research is also reflected in the large number of external PhD projects with about half of the administrative unit's PhD candidates employed in the institute sector (23) or industry (10). Members of the administrative unit were key players in the successful sequencing of wheat and Atlantic salmon. This is outstanding and clearly contributed to their reputation in Norway and abroad.

5. Relevance to society

The administrative unit's research directly contributes to fulfilling the UN SDGs, as it is directed toward sustainable and climate-friendly food production and food safety. This is of exceptionally high societal relevance given the pressing need to transform the economy and discover more sustainable and climate-friendly ways of feeding the population. The four impact cases provided by the administrative unit impressively demonstrate this.

Of note, the administrative unit provides the data about greenhouse gas emissions from agriculture to the "climate calculator" for farmers to estimate climate impact. Also, new breeding technologies and their use are important contributions to society.

The administrative unit is very active in translational research and collaborations with industry. This success in translational research is firmly rooted in the administrative unit's coherent approach to and systematic support of collaborative work with industry. Their state-of-the-art IP retention plan has led to several important patents coming out of the administrative unit. In addition to working with established industrial partners, the administrative unit could in the future, however, also explore more options of founding its own spin-offs or start-ups, providing an attractive alternative career path to researchers and graduates.

Comments on impact case 1 – Foods of Norway: novel protein sources for farmed animals

The "Foods of Norway" project was carried out at the administrative unit between 2015 and 2022. It successfully developed protein sources for farmed animals (land and sea) by bioconversion of forestry by-products. This pioneering project led to six publications in specialised application-oriented journals and four conference presentations. The conversion was based on carefully screened yeast strains, which led to the very interesting research question of how the animals react to the presence of yeast ingredients in their diet.

This work has potentially far-reaching implications, as it can be applied also outside Norway wherever suitable substrate waste is available, and for producing proteins also for other applications. It is therefore reassuring to see that the results of this work were picked up by several national media channels, web media, and NGOs. The work was also a great example of successful collaboration with other NMBU faculties (KBM and Vet) as well as industry (Borregaard, Lallemand, Norilia, Biomar and Felleskjøpet).

Two of the long-term outcomes of the project were a new method for feed development and a knowledge platform and documentation up-scaling and commercialisation.

Given the success of this project, the administrative unit could attempt to publish the results also in higher-impact journals for more general audiences. This would help them gain international visibility and reputation. It also provides a potential opportunity for a start-up to help other places implement and use this technology.

Comments on impact case 2 – Towards genomic selection in practical cattle, pig, sheep, goat and salmon breeding schemes

Between 2011 and 2021, the administrative unit led a research project on genomic selection in livestock species, such as cattle, pig, sheep, goat, and salmon. This was based on the availability of dense genome-wide markers and cost-effective genotyping methods. In the project, those were successfully translated into practical breeding schemes that are ready to be used by farms and producers.

Particularly impressive, this project spanned the whole breadth from mathematical theory over algorithmic computational improvements to large-scale computer simulation studies and finally a practical breeding scheme. This is also reflected in the six publications that resulted from the project,

which range from basic generics journals to more specialised and application-oriented outlets, which is very good outcome.

As a main impact of the research, genetic marker-based breeding was already implemented by several industrial partners for pig, salmon, cattle, sheep, and goat. While the effect of the new breeding scheme is difficult to quantify, it did improve the accuracy of the process and therefore its efficiency. This has already led to increased sales and revenues for the companies on the international market.

This work was also recognised internationally and Prof. Theo Meuwissen from the administrative unit was awarded the John J. Carty Award by the American National Academy of Sciences for it. Congratulations!

Comments on impact case 3 – Optical radiation: plant protection against fungal pest diseases

From 2008 to 2016, research at the administrative unit developed an optical UV-irradiation technique as an alternative to fungicides to control fungal diseases in crop plants. It was shown that a combination of different UV wavelengths can be used in both greenhouses and in the field to phase out fungicides. Together with the robotics groups of NMBU and an industrial partner, the technology was integrated into a robot platform, which is now available for practical use in several countries including Norway, the UK and the US.

The simple yet elegant trick was to apply the UV irradiation at night, when the light-driven genome repair mechanisms of the fungi are not working. This was very effective against mildews even at low UV intensities. The photochemical and molecular mechanisms were worked out, and suitable LED emitters for field use were designed.

Six research papers by the same first author came out of this project. However, they were published in only two journals, both application-specific, whereas this project could have had the potential for a higher-impact publication in a more generalist journal. User journals and farming publications picked up on it, which led to rapid commercial adoption. This created great value with the system already adopted in California, Florida and the UK. The robot is marketed by a spin-off company of the robotics group of NMBU. *The administrative unit should make sure it gets its fair share of the return and not undersell its contributions.*

Comments to impact case 4 – Applying genomics to advance aquaculture and manage wild populations of Atlantic salmon

Since 2009, the administrative unit is engaged in building a genomic resource for Atlantic salmon. This would enable leveraging genetic tools from breeding to boost salmon aquaculture as well as enabling the global research community to better understand the genetics of salmon and the biodiversity of wild salmon species.

The first step was to sequence the salmon genome in collaboration with institutes in Chile and Canada. This led to the first salmon reference genome, published in the journals Nature and made available via the Norwegian ELIXIR node. The next step was the salmon pan-genome and functional genome annotation, which were done in the EU project AQUA-FAANG. The results are publicly available on the salmonbase website developed by the administrative unit in the Norwegian ELIXIR node. In addition, it relied on the national infrastructure CIGENE for sequencing.

All six publications of the project were published in high-impact journals (2xNature, Nature Genetics, Genetics, Trans. Roy. Soc. B) and all of them are already highly cited. This is truly outstanding.

Already, the genetic locus for resistance against an important virus could be identified. The commercial potential for application is in the billions and the administrative unit could consider own

commercialisation options. This led to several follow-up publications in journals like BMC Genetics and Nature Communications. Importantly, it can also be used to protect wild salmon populations from side-effects of aquafarming and preserve biodiversity.

Appendices

List of research groups

Institution	Administrative unit	Research group
Norwegian University of Life Sciences (NMBU)	Faculty of Bioscience (BIOVIT)	<i>Breeding, Genetics and Food Production Systems</i>
		<i>Ethology and animal environment</i>
		<i>Genome Biology</i>
		<i>Genetics and Plant Breeding</i>
		<i>Nutrition and Physiology in Monogastric Animals</i>
		<i>Plant Biology and Plant Biotechnology</i>
		<i>Plant Protection and Food Crops</i>
		<i>Ruminant Nutrition and Physiology</i>

Methods and limitations

Methods

The evaluation is based on documentary evidence and online interviews with the representatives of Administrative unit.

The documentary inputs to the evaluation were:

- Evaluation Protocol Evaluation of life sciences in Norway 2022-2023
- Administrative unit's Terms of Reference
- Administrative unit's self-assessment report
- Administrative unit's impact cases
- Administrative unit's research groups evaluation reports
- Panel reports from the Expert panels
- Bibliometric data (*NIFU Nordic Institute for Studies of innovation, research and education*)
- Personnel data (*Statistics Norway (SSB)*)
- Funding data – The Research Council's contribution to biosciences research (*RCN*)
- Extract from the Survey for academic staff and the Student Survey (*Norwegian Agency for Quality Assurance in Education (NOKUT)*)

After the document review, the Committee met and conducted an initial assessment against the assessment criteria and defined questions for the interview with the Administrative unit. The Committee shared the interview questions with the Administrative unit three weeks before the interview.

The Committee interviewed the Administrative unit in an hour-long virtual meeting to validate the Committee's understanding and refine perceptions as well as fill any gaps in understanding and evidence. The Administrative unit answered the Committee's questions including any follow-up questions.

After the online interview, the Committee held a meeting to review the initial assessment in light of the interview and draft a report based on their assessment of the Administrative unit against the assessment criteria.

A one-page profile of the Administrative unit was drafted based on information from the self-assessment. The Administrative unit had the opportunity to fact-check this profile. Thereafter, the profile was included in the final draft of the report.

The final draft was reviewed by committee members and any comments were addressed. After a final copy-edit, the final report was approved by the Committee.

Limitations

The Committee judged the information received through documentary inputs and the interview with the Administrative unit sufficient to complete the evaluation.

Evaluation of Biosciences 2022-2023

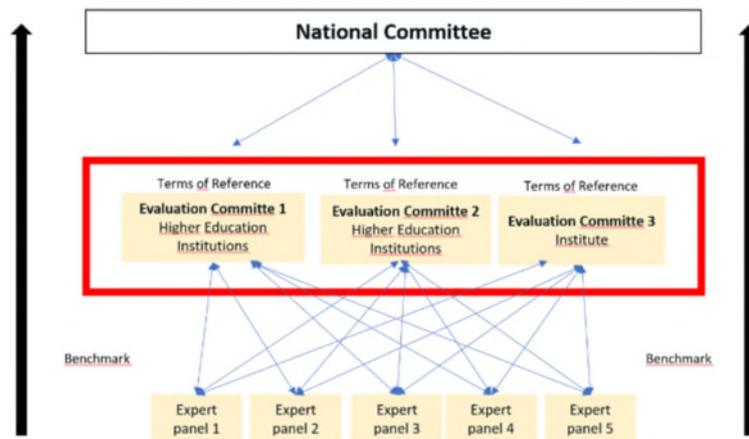
By evaluating Norwegian research and higher education we aim to enhance the quality, relevance, and efficiency. In accordance with the statutes of the Research Council of Norway (RCN), the RCN evaluates Norwegian professional environments to create a solid and up-to-date knowledge base about Norwegian research and higher education in an international perspective.

The evaluation of life sciences is conducted in 2022 - 2024. The evaluation of biosciences takes place in 2022 - 2023, and the evaluation of medicine and health is carried out in 2023-2024. The primary aim of the evaluation of life sciences is to reveal and confirm the quality and the relevance of research performed at Norwegian Higher Education Institutions (HEIs), the institute sector and the health trusts. The evaluation shall result in recommendations to the institutions, the RCN and the ministries.

Evaluation of biosciences (EVALBIOVIT) 2022-2023

The evaluation of biosciences includes twenty-two administrative units (e.g., faculty, department, institution) which are assessed by evaluation committees according to sectorial affiliation and/or other relevant similarities between the units. The administrative units enrolled their research groups (97) to five expert panels organised by research subjects or themes and assessed across institutions and sectors.

Organisation of evaluation of biosciences research 2022 - 2023



The institutions have been allowed to adapt the evaluation mandate (Terms of Reference) to their own strategic goals. This is to ensure that the results of the evaluation will be useful for the institution's own strategic development. The administrative unit together with the research group(s) selects an appropriate benchmark for each of the research group(s).

The Research Council of Norway has commissioned an external evaluation secretariat at Technopolis Group for the implementation of the evaluation process.

Each institution/administrative unit is responsible for following up the recommendations that apply to their own institution/administrative unit. The Research Council will use the results from the evaluation in the development of funding instruments and as a basis for advice to the Government.

The web page for the evaluation of biosciences 2022-2023:

<https://www.forskningsradet.no/en/analysis-numbers/evaluations/subject-theme/biosciences/>

Til innmeldte administrative enheter til
fagevaluering av biovitenskap (EVALBIOVIT)

Vår saksbehandler/tlf.
Hilde D.G. Nielsen/4092 2260

Vår ref.
21/10653
Deres ref.

Oslo,
21.04.2022

Fagevaluering av biovitenskap (EVALBIOVIT) 2022 – 2023

Vi viser til invitasjonsbrev om å delta i fagevaluering av biovitenskap (EVALBIOVIT) datert 11.11.2021 og til informasjonsmøte med innmeldte administrative enheter 15.12.2021.

Porteføljestyret for livsvitenskap vedtok evalueringsprotokollen for fagevaluering av biovitenskap 05.04.2022 (vedlegg 1). Protokollen beskriver roller, prosesser og ansvarsfordeling i evalueringsarbeidet og er i tråd med forslaget til nytt nasjonalt rammeverk for evaluering av forskning og høyere utdanning utarbeidet i regi av Kunnskapsdepartementet.

Forskningsrådet har mottatt innmelding av 37 administrative enheter til EVALBIOVIT. Disse vil bli fordelt på sektorspesifikke evalueringskomitéer: 1-2 evalueringskomité/er for administrative enheter som tilhører instituttsektoren og 1-2 evalueringskomité/er for administrative enheter som tilhører UH-sektor. Universitetsmuseene vil bli evaluert samlet i én evalueringskomité for UH-sektor. Det skal i tillegg opprettes internasjonale fagekspertpaneler etter faglig eller tematisk likhet på tvers av sektorer. Ekspertpanelene skal evaluere forskergruppene som de administrative enhetene melder inn. Evalueringskomitéene og ekspertpanelene skal vurdere de innsamlede dataene og gi anbefalinger til den enkelte institusjon, til Forskningsrådet og til departementene.

Tilpasning av mandat (vedlegg 1)

Forskningsrådet ber med dette administrative enheter om å tilpasse mandatet (vedlegg 1) til de lokale forhold ved egen institusjon. Tilpasningen gjøres ved å fylle inn de åpne punktene i malen (Appendix A). Utfylt skjema sendes på epost til evalbiovit@forskningsradet.no innen 30. september 2022.

Innmelding av forskergrupper (vedlegg 2a og 2b)

Forskningsrådet ber administrative enheter om å melde inn forskergrupper i tråd med forskergruppedefinisjonen beskrevet i kapittel 1.2 i evalueringsprotokollen. Det bes også om at forskergruppene innplasseres i den tentative fagpanelinndelingen for EVALBIOVIT (vedlegg 2a). Utfylt regneark (vedlegg 2b) sendes til evalbiovit@forskningsradet.no innen 31. mai 2022.

Forskningsrådet vil ferdigstille panelstruktur og avgjøre den endelige fordelingen av forskergruppene på fagpaneler etter at alle forskergrupper er meldt inn.

Invitasjon til å foreslå eksperter (vedlegg 3a og 3b)

Forskningsrådet inviterer administrative enheter til å spille inn forslag til eksperter som kan inngå i evalueringskomitéene og i ekspertpanelene (vedlegg 3a). Hver evalueringskomité skal bestå av 7-9 komitémedlemmer. Hvert ekspertpanel skal bestå av 5-7 eksperter. Utfylt regneark (vedlegg 3b, fane 1 og fane 2) sendes til evalbiovit@forskningsradet.no innen 31. mai 2022.

Forskningsrådet v/porteføljestyret for livsvitenskap vil oppnevne leder og medlemmer til evalueringskomitéene og til ekspertpanelene.

Data og datainnsamling

Forskningsrådet har nå ute et oppdrag for analyse av data om personal og forskningsproduksjon. Analysen skal i hovedsak baseres på data i DBH, NIFUs forskerpersonaleregister og Cristin. Analysene vil inkludere indikatorer som skal brukes for evaluering av alle institusjoner.

Videre vil institusjonene få et ansvar for innsamling av data til en egevaluering som skal inngå i vurderingsgrunnlaget for evalueringskomitéene. For å sikre at evalueringen blir nyttig for forskningsinstitusjonenes utvikling, vil Forskningsrådet også invitere institusjonene til å delta i utvelgelse av relevante evalueringsdata og indikatorer som kan danne grunnlag for vurdering opp mot institusjonens egne strategiske mål og sektormål. På bakgrunn av dette har Forskningsrådet en forventning om at institusjonene som deltar i evalueringen stiller med nødvendige ressurser gjennom hele evalueringsprosessen.

Forskningsrådet har, etter en anbudskonkurranse om sekretariatstjenester, inngått en avtale med Technopolis Group som skal bistå Forskningsrådets administrasjon i arbeidet med EVALBIOVIT. Sekretariatet skal blant annet koordinere datainnsamlingen fra institusjonene og systematisere det innsamlede materialet for vurdering i ekspertpaneler og evalueringskomitéer.

Endring av administrativ enhet

For noen få tilfeller kan det være behov for å gjøre noen endringer i forhold til den administrative enheten¹ som allerede er innmeldt til EVALBIOVIT. For eksempel kan et fakultet som ble meldt inn samlet til EVALBIOVIT i desember 2021 finne det mer hensiktsmessig å heller melde inn fakultetets institutter som egne administrative enheter. Hvis man ønsker å endre på den administrative enheten må dette meldes Forskningsrådets administrasjon så fort som mulig, men ikke senere enn 31.05.2022. Melding om endring sendes på epost til: evalbiovit@forskningsradet.no.

Informasjonsmøte 9. mai 2022 og nettside for EVALBIOVIT

Forskningsrådet arrangerer 09.05.2022 kl. 12.00-12.45 et informasjonsmøte for alle som deltar i EVALBIOVIT. Møtet vil foregå digitalt (Zoom). Vi vil i møtet bl.a. gå gjennom evalueringsprotokollen samt at det vil være mulig å stille spørsmål. Påmelding til evalbiovit@forskningsradet.no innen 07.05.2022.

Forskningsrådet har opprette en egen nettside hvor informasjon om EVALBIOVIT vil bli publisert fortløpende. Lenke til nettsiden finner dere her: <https://www.forskningsradet.no/statistikk-evalueringer/biovitenskap-2022-2023/>.

¹ Med administrativ enhet menes en organisatorisk enhet på nivå 2 eller 3 i organisasjonsstrukturen til DBH for UH sektor eller NIFUs organisasjonsregister for institutt- og helsesektoren.

Spørsmål som gjelder fagevalueringen kan sendes på epost til evalbiovit@forskningsradet.no eller ved å kontakte Hilde Dorthea Grindvik Nielsen på epost hgn@forskningsradet.no /mobil 40 92 22 60.

Med vennlig hilsen
Norges forskningsråd

Ole Johan Borge
avdelingsdirektør
Avdeling for helseforskning og helseinnovasjon

Hilde G. Nielsen
spesialrådgiver
Avdeling for helseforskning og helseinnovasjon

Vedlegg

1. Evalueringsprotokoll for fagevaluering av biovitenskap 2022-2023
- 2a. Tentativ fagpanelinndeling for evaluering av forskergrupper
- 2b. Skjema for innmelding av forskergrupper
- 3a. Invitasjon til å foreslå eksperter og informasjon om evalueringskomitéer og ekspertpaneler
- 3b. Skjema for å foreslå eksperter til evalueringskomitéer og ekspertpaneler

Evaluation of life sciences in Norway 2022-2023

LIVSEVAL protocol version 1.0

By decision of the Portfolio board for life sciences April 5., 2022

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Oslo, 5 April 2022

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1 Introduction

Research assessments based on this protocol serve different aims and have different target groups. The primary aim of the evaluation of life sciences is to reveal and confirm the quality and the relevance of research performed at Norwegian Higher Education Institutions (HEIs), and by the institute sector and regional health authorities and health trusts. These institutions will hereafter be collectively referred to as Research Performing Organisations (RPOs). The assessments should serve a formative purpose by contributing to the development of research quality and relevance at these institutions and at the national level.

1.1 Evaluation units

The assessment will comprise a number of *administrative units* submitted for evaluation by the host institution. By assessing these administrative units in light of the goals and strategies set for them by their host institution, it will be possible to learn more about how public funding is used at the institution(s) to facilitate high-quality research and how this research contributes to society. The administrative units will be assessed by evaluation committees according to sectoral affiliation and/or other relevant similarities between the units.

The administrative units will be invited to submit data on their *research groups* to be assessed by expert panels organised by research subject or theme. See Chapter 3 for details on organisation.

<i>Administrative unit</i>	An administrative unit is any part of an RPO that is recognised as a formal (administrative) unit of that RPO, with a designated budget, strategic goals and dedicated management. It may, for instance, be a university faculty or department, a department of an independent research institute or a hospital.
<i>Research group</i>	Designates groups of researchers within the administrative units that fulfil the minimum requirements set out in section 1.2. Research groups are identified and submitted for evaluation by the administrative unit, which may decide to consider itself a single research group.

1.2 Minimum requirements for research groups

- 1) The research group must be sufficiently large in size, i.e. at least five persons in full-time positions with research obligations. This merely indicates the minimum number, and larger units are preferable. In exceptional cases, the minimum number may include PhD students, postdoctoral fellows and/or non-tenured researchers. *In all cases, a research group must include at least three full-time tenured staff.* Adjunct professors, technical staff and other relevant personnel may be listed as group members but may not be included in the minimum number.

- 2) The research group subject to assessment must have been established for at least three years. Groups of more recent date may be accepted if they have come into existence as a consequence of major organisational changes within their host institution.
- 3) The research group should be known as such both within and outside the institution (e.g. have a separate website). It should be able to document common activities and results in the form of co-publications, research databases and infrastructure, software, or shared responsibilities for delivering education, health services or research-based solutions to designated markets.
- 4) In its self-assessment, the administrative unit should propose a suitable benchmark for the research group. The benchmark will be considered by the expert panels as a reference in their assessment of the performance of the group. The benchmark can be grounded in both academic and extra-academic standards and targets, depending on the purpose of the group and its host institution.

1.3 The evaluation in a nutshell

The assessment concerns:

- research that the administrative unit and its research groups have conducted in the previous 10 years
- the research strategy that the administrative units under evaluation intend to pursue going forward
- the capacity and quality of research in life sciences at the national level

The Research Council of Norway (RCN) will:

- provide a template for the Terms of Reference¹ for the assessment of RPOs and a national-level assessment in life sciences
- appoint members to evaluation committees and expert panels
- provide secretarial services
- commission reports on research personnel and publications based on data in national registries
- take responsibility for following up assessments and recommendations at the national level.

RPOs conducting research in life sciences are expected to take part in the evaluation. The board of each RPO under evaluation is responsible for tailoring the assessment to its own strategies and specific needs and for following them up within their own institution. Each participating RPO will carry out the following steps:

- 1) Identify the administrative unit(s) to be included as the main unit(s) of assessment
- 2) Specify the Terms of Reference by including information on specific tasks and/or strategic goals of relevance to the administrative unit(s)

¹ The terms of reference (ToR) document defines all aspects of how the evaluation committees and expert panels will conduct the [research area] evaluation. It defines the objectives and the scope of the evaluation, outlines the responsibilities of the involved parties, and provides a description of the resources available to carry out the evaluation.

- 3) The administrative unit will, in turn, be invited to register a set of research groups that fulfil the minimum criteria specified above (see section 1.2). The administrative unit may decide to consider itself a single research group.
- 4) For each research group, the administrative unit should select an appropriate benchmark in consultation with the group in question. This benchmark can be a reference to an academic level of performance or to the group's contributions to other institutional or sectoral purposes (see section 2.4). The benchmark will be used as a reference in the assessment of the unit by the expert panel.
- 5) The administrative units subject to assessment must provide information about each of their research groups, and about the administrative unit as a whole, by preparing self-assessments and by providing additional documentation in support of the self-assessment.

1.4 Target groups

- Administrative units represented by institutional management and boards
- Research groups represented by researchers and research group leaders
- Research funders
- Government

The evaluation will result in recommendations to the institutions, the RCN and the ministries. The results of the evaluation will also be disseminated for the benefit of potential students, users of research and society at large.

This protocol is intended for all participants in the evaluation. It provides the information required to organise and carry out the research assessments. Questions about the interpretation or implementation of the protocol should be addressed to the RCN.

2 Assessment criteria

The administrative units are to be assessed on the basis of five assessment criteria. The five criteria are applied in accordance with international standards. Finally, the evaluation committee passes judgement on the administrative units as a whole in qualitative terms. In this overall assessment, the committee should relate the assessment of the specific tasks to the strategic goals that the administrative unit has set for itself in the Terms of Reference.

When assessing administrative units, the committees will build on a separate assessment by expert panels of the research groups within the administrative units. See Chapter 3 'Evaluation process and organisation' for a description of the division of tasks.

2.1 Strategy, resources and organisation

The evaluation committee assesses the framework conditions for research in terms of funding, personnel, recruitment and research infrastructure in relation to the strategic aims set for the administrative unit. The administrative unit should address at least the following five specific aspects in its self-assessment: 1) funding sources, 2) national and international cooperation, 3) cross-sector and interdisciplinary cooperation, 4) research careers and mobility, and 5) Open Science. These five aspects relate to how the unit organises and actually performs its research, its composition in terms of leadership and personnel, and how the unit is run on a day-to-day basis.

To contribute to understanding what the administrative unit can or should change to improve its ability to perform, the evaluation committee is invited to focus on factors that may affect performance.

Further, the evaluation committee assesses the extent to which the administrative unit's goals for the future remain scientifically and societally relevant. It is also assessed whether its aims and strategy, as well as the foresight of its leadership and its overall management, are optimal in relation to attaining these goals. Finally, it is assessed whether the plans and resources are adequate to implement this strategy.

2.2 Research production, quality and integrity

The evaluation committee assesses the profile and quality of the administrative unit's research and the contribution the research makes to the body of scholarly knowledge and the knowledge base for other relevant sectors of society. The committee also assesses the scale of the unit's research results (scholarly publications, research infrastructure developed by the unit, and other contributions to the field) and its contribution to Open Science (early knowledge and sharing of data and other relevant digital objects, as well as science communication and collaboration with societal partners, where appropriate).

The evaluation committee considers the administrative unit's policy for research integrity and how violations of such integrity are prevented. It is interested in how the unit deals with research data, data management, confidentiality (GDPR) and integrity, and the extent to which independent and critical pursuit of research is made possible within the unit. Research integrity relates to both the scientific integrity of conducted research and the professional integrity of researchers.

2.3 Diversity and equality

The evaluation committee considers the diversity of the administrative unit, including gender equality. The presence of differences can be a powerful incentive for creativity and talent development in a diverse administrative unit. Diversity is not an end in itself in that regard, but a tool for bringing together different perspectives and opinions.

The evaluation committee considers the strategy and practices of the administrative unit to prevent discrimination on the grounds of gender, age, disability, ethnicity, religion, sexual orientation or other personal characteristics.

2.4 Relevance to institutional and sectoral purposes

The evaluation committee compares the relevance of the administrative unit's activities and results to the specific aspects detailed in the Terms of Reference for each institution and to the relevant sectoral goals (see below).

Higher Education Institutions

There are 36 Higher Education Institutions in Norway that receive public funding from the Ministry for Education and Research. Twenty-one of the 36 institutions are owned by the ministry, whereas the last 15 are privately owned. The HEIs are regulated under the Act relating to universities and university colleges of 1 August 2005.

The purposes of Norwegian HEIs are defined as follows in the Act relating to universities and university colleges²

- provide higher education at a high international level;
- conduct research and academic and artistic development work at a high international level;
- disseminate knowledge of the institution's activities and promote an understanding of the principle of academic freedom and application of scientific and artistic methods and results in the teaching of students, in the institution's own general activity as well as in public administration, in cultural life and in business and industry.

In line with these purposes, the Ministry for Research and Education has defined four overall goals for HEIs that receive public funding. These goals have been applied since 2015:

- 1) High quality in research and education
- 2) Research and education for welfare, value creation and innovation
- 3) Access to education (esp. capacity in health and teacher education)
- 4) Efficiency, diversity and solidity of the higher education sector and research system

The committee is invited to assess to what extent the research activities and results of each administrative unit have contributed to sectoral purposes as defined above. In particular, the committee is invited to take the share of resources spent on education at the administrative units into account and to assess the relevance and contributions of research to education, focusing on the master's and PhD levels. This assessment should be distinguished from an

² <https://lovdata.no/dokument/NLE/lov/2005-04-01-15?q=universities>

assessment of the quality of education in itself, and it is limited to the role of research in fostering high-quality education.

Research institutes (the institute sector)

Norway's large institute sector reflects a practical orientation of state R&D funding that has long historical roots. The Government's strategy for the institute sector³ applies to the 33 independent research institutes that receive public basic funding through the RCN, in addition to 12 institutes outside the public basic funding system.

The institute sector plays an important and specific role in attaining the overall goal of the national research system, i.e. to increase competitiveness and innovation power to address major societal challenges. The research institutes' contributions to achieving these objectives should therefore form the basis for the evaluation. The main purpose of the sector is to conduct independent applied research for present and future use in the private and public sector. However, some institutes primarily focus on developing a research platform for public policy decisions, others on fulfilling their public responsibilities.

The institutes should:

- maintain a sound academic level, documented through scientific publications in recognised journals
- obtain competitive national and/or international research funding grants
- conduct contract research for private and/or public clients
- demonstrate robustness by having a reasonable number of researchers allocated to each research field

The committee is invited to assess the extent to which the research activities and results of each administrative unit contribute to sectoral purposes and overall goals as defined above. In particular, the committee is invited to assess the level of collaboration between the administrative unit(s) and partners in their own or other sectors.

The hospital sector

There are four regional health authorities (RHF) in Norway. They are responsible for the specialist health service in their respective regions. The RHF are regulated through the Health Enterprises Act of 15 June 2001 and are bound by requirements that apply to specialist and other health services, the Health Personnel Act and the Patient Rights Act. Under each of the regional health authorities, there are several health trusts (HF), which can consist of one or more hospitals. A health trust (HF) is wholly owned by an RHF.

Research is one of the four main tasks of hospital trusts.⁴ The three other main tasks are to ensure good treatment, education and training of patients and relatives. Research is important if the health service is to keep abreast of stay up-to-date with medical developments and carry out critical assessments of established and new diagnostic methods,

³ [Strategy for a holistic institute policy \(Kunnskapsdepartementet 2020\)](#)

⁴ Cf. the Specialist Health Services Act § 3-8 and the Health Enterprises Act §§ 1 and 2

treatment options and technology, and work on quality development and patient safety while caring for and guiding patients.

The committee is invited to assess the extent to which the research activities and results of each administrative unit have contributed to sectoral purposes as described above. The assessment does not include an evaluation of the health services performed by the services.

2.5 Relevance to society

The committee assesses the quality, scale and relevance of contributions targeting specific economic, social or cultural target groups, of advisory reports on policy, of contributions to public debates, and so on. The documentation provided as the basis for the assessment of societal relevance should make it possible to assess relevance to various sectors of society (i.e. business, the public sector, non-governmental organisations and civil society).

When relevant, the administrative units will be asked to link their contributions to national and international goals set for research, including the Norwegian Long-term Plan for Research and Higher Education and the UN Sustainable Development Goals. Sector-specific objectives, e.g. those described in the Development Agreements for the HEIs and other national guidelines for the different sectors, will be assessed as part of criterion 2.4.

The committee is also invited to assess the societal impact of research based on case studies submitted by the administrative units and/or other relevant data presented to the committee. Academic impact will be assessed as part of criterion 2.2.

3 Evaluation process and organisation

The RCN will organise the assessment process as follows:

- Commission a professional secretariat to support the assessment process in the committees and panels, as well as the production of self-assessments within each RPO
- Commission reports on research personnel and publications within life sciences based on data in national registries
- Appoint one or more evaluation committees for the assessment of administrative units.
- Divide the administrative units between the appointed evaluation committees according to sectoral affiliation and/or other relevant similarities between the units.
- Appoint a number of expert panels for the assessment of research groups submitted by the administrative units.
- Divide research groups between expert panels according to similarity of research subjects or themes.
- Task the chairs of the evaluation committees with producing a national-level report building on the assessments of administrative units and a national-level assessments produced by the expert panels.

Committee members and members of the expert panels will be international, have sufficient competence and be able, as a body, to pass judgement based on all relevant assessment criteria. The RCN will facilitate the connection between the assessment levels of panels and committees by appointing committee members as panel chairs.

3.1 Division of tasks between the committee and panel levels

The expert panels will assess research groups across institutions and sectors, focusing on the first two criteria specified in Chapter 2: 'Strategy, resources and organisation' and 'Research production and quality' The assessments from the expert panels will also be used as part of the evidence base for a report on Norwegian research within life sciences (see section 3.3).

The evaluation committees will assess the administrative units based on all the criteria specified in Chapter 2. The assessment of research groups delivered by the expert panels will be a part of the evidence base for the committees' assessments of administrative units. See figure 1 below.

The evaluation committee has sole responsibility for the assessments and any recommendations in the report. The evaluation committee reaches a judgement on the research based on the administrative units and research groups' self-assessments provided by the RPOs, any additional documents provided by the RCN, and interviews with representatives of the administrative units. The additional documents will include a standardised analysis of research personnel and publications provided by the RCN.

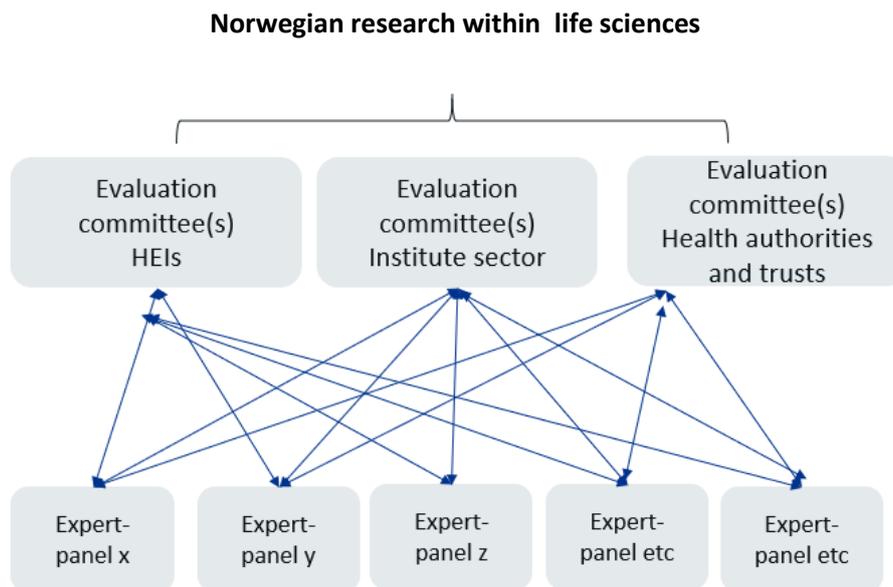


Figure 1. Evaluation committees and expert panels

The evaluation committee takes international trends and developments in science and society into account when forming its judgement. When judging the quality and relevance of the research, the committees shall bear in mind the specific tasks and/or strategic goals that the administrative unit has set for itself including sectoral purposes (see section 2.4 above).

3.2 Accuracy of factual information

The administrative unit under evaluation should be consulted to check the factual information before the final report is delivered to the RCN and the board of the institution hosting the administrative unit.

3.3 National level report

Finally, the RCN will ask the chairs of the evaluation committees to produce a national-level report that builds on the assessments of administrative units and the national-level assessments produced by the expert panels. The committee chairs will present their assessment of Norwegian research in life sciences at the national level in a separate report that pays specific attention to:

- Strengths and weaknesses of the research area in the international context
- The general resource situation regarding funding, personnel and infrastructure
- PhD training, recruitment, mobility and diversity
- Research cooperation nationally and internationally
- Societal impact and the role of research in society, including Open Science

This national-level assessment should be presented to the RCN.

Appendix A: Terms of References (ToR)

[Text in red to be filled in by the Research-performing organisations (RPOs)]

The board of [RPO] mandates the evaluation committee appointed by the Research Council of Norway (RCN) to assess [administrative unit] based on the following Terms of Reference.

Assessment

You are asked to assess the organisation, quality and diversity of research conducted by [administrative unit] as well as its relevance to institutional and sectoral purposes, and to society at large. You should do so by judging the unit's performance based on the following five assessment criteria (a. to e.). Be sure to take current international trends and developments in science and society into account in your analysis.

- a) Strategy, resources and organisation
- b) Research production, quality and integrity
- c) Diversity and equality
- d) Relevance to institutional and sectoral purposes
- e) Relevance to society

For a description of these criteria, see Chapter 2 of the life sciences evaluation protocol. Please provide a written assessment for each of the five criteria. Please also provide recommendations for improvement. We ask you to pay special attention to the following [n] aspects in your assessment:

1. ...
2. ...
3. ...
4. ...
- ...

[To be completed by the board: specific aspects that the evaluation committee should focus on – they may be related to a) strategic issues, or b) an administrative unit's specific tasks.]

In addition, we would like your report to provide a qualitative assessment of [administrative unit] as a whole in relation to its strategic targets. The committee assesses the strategy that the administrative unit intends to pursue in the years ahead and the extent to which it will be capable of meeting its targets for research and society during this period based on available resources and competence. The committee is also invited to make recommendations concerning these two subjects.

Documentation

The necessary documentation will be made available by the **life sciences** secretariat at Technopolis Group.

The documents will include the following:

- a report on research personnel and publications within life sciences commissioned by RCN
- a self-assessment based on a template provided by the life sciences secretariat
- **[to be completed by the board]**

Interviews with representatives from the evaluated units

Interviews with the **[administrative unit]** will be organised by the evaluation secretariat. Such interviews can be organised as a site visit, in another specified location in Norway or as a video conference.

Statement on impartiality and confidence

The assessment should be carried out in accordance with the *Regulations on Impartiality and Confidence in the Research Council of Norway*. A statement on the impartiality of the committee members has been recorded by the RCN as a part of the appointment process. The impartiality and confidence of committee and panel members should be confirmed when evaluation data from **[the administrative unit]** are made available to the committee and the panels, and before any assessments are made based on these data. The RCN should be notified if questions concerning impartiality and confidence are raised by committee members during the evaluation process.

Assessment report

We ask you to report your findings in an assessment report drawn up in accordance with a format specified by the life sciences secretariat. The committee may suggest adjustments to this format at its first meeting. A draft report should be sent to the **[administrative unit]** and RCN by [date]. The **[administrative unit]** should be allowed to check the report for factual inaccuracies; if such inaccuracies are found, they should be reported to the life sciences secretariat no later than two weeks after receipt of the draft report. After the committee has made the amendments judged necessary, a corrected version of the assessment report should be sent to the board of **[the RPO]** and the RCN no later than two weeks after all feedback on inaccuracies has been received from **[administrative unit]**.

Appendix B: Data sources

The lists below shows the most relevant data providers and types of data to be included in the evaluation. Data are categorised in two broad categories according to the data source: National registers and self-assessments prepared by the RFOs. The RCN will commission an analysis of data in national registers (R&D-expenditure, personnel, publications etc.) to be used as support for the committees' assessment of administrative units. The analysis will include a set of indicators related to research personnel and publications.

- **National directorates and data providers**
- Norwegian Directorate for Higher Education and Skills (HK-dir)
- Norwegian Agency for Quality Assurance in Education (NOKUT)
- Norwegian Agency for Shared Services in Education and Research (SIKT)
- Research Council of Norway (RCN)
- Statistics Norway (SSB)

National registers

- 1) R&D-expenditure
 - a. SSB: R&D statistics
 - b. SSB: Key figures for research institutes
 - c. HK-dir: Database for Statistics on Higher Education (DBH)
 - d. RCN: Project funding database (DVH)
 - e. EU-funding: eCorda
- 2) Research personnel
 - a. SSB: The Register of Research personnel
 - b. SSB: The Doctoral Degree Register
 - c. RCN: Key figures for research institutes
 - d. HK-dir: Database for Statistics on Higher Education (DBH)
- 3) Research publications
 - a. SIKT: Cristin - Current research information system in Norway
 - b. SIKT: Norwegian Infrastructure for Bibliometrics
(full bibliometric data incl. citations and co-authors)
- 4) Education
 - a. HK-dir/DBH: Students and study points
 - b. NOKUT: Study barometer
 - c. NOKUT: National Teacher Survey
- 5) Sector-oriented research
 - a. RCN: Key figures for research institutes
- 6) Patient treatments and health care services
 - a. Research & Innovation expenditure in the health trusts
 - b. Measurement of research and innovation activity in the health trusts
 - c. Collaboration between health trusts and HEIs
 - d. Funding of research and innovation in the health trusts
 - e. Classification of medical and health research using HRCS (HO21 monitor)

Self-assessments

1) Administrative units

- a. *Self-assessment covering all assessment criteria*
- b. Administrative data on funding sources
- c. Administrative data on personnel
- d. Administrative data on the division of staff resources between research and other activities (teaching, dissemination etc.)
- e. Administrative data on research infrastructure and other support structures
- f. SWOT analysis
- g. Any supplementary data needed to assess performance related to the strategic goals and specific tasks of the unit

2) Research groups

- a. *Self-assessment covering the first two assessment criteria (see Table 1)*
- b. Administrative data on funding sources
- c. Administrative data on personnel
- d. Administrative data on contribution to sectoral purposes: teaching, commissioned work, clinical work [will be assessed at committee level]
- e. Publication profiles
- f. Example publications and other research results (databases, software etc.)
The examples should be accompanied by an explanation of the groups' specific contributions to the result
- g. Any supplementary data needed to assess performance related to the benchmark defined by the administrative unit

The table below shows how different types of evaluation data may be relevant to different evaluation criteria. Please note that the self-assessment produced by the administrative units in the form of a written account of management, activities, results etc. should cover all criteria. A template for the self-assessment of research groups and administrative units will be commissioned by the RCN from the life sciences secretariat for the evaluation.

Table 1. Types of evaluation data per criterion

Criteria	Evaluation units	Research groups	Administrative units
Strategy, resources and organisation		Self-assessment Administrative data	Self-assessment National registers Administrative data SWOT analysis
Research production and quality		Self-assessment Example publications (and other research results)	Self-assessment National registers
Diversity, equality and integrity			Self-assessment National registers Administrative data
Relevance to institutional and sectoral purposes			Self-assessment Administrative data
Relevance to society			Self-assessment National registers Impact cases
Overall assessment		<i>Data related to: Benchmark defined by administrative unit</i>	<i>Data related to: Strategic goals and specific tasks of the admin. unit</i>



Scales for research group assessment

Organisational dimension

Score	Organisational environment
5	An organisational environment that is outstanding for supporting the production of excellent research.
4	An organisational environment that is very strong for supporting the production of excellent research.
3	An organisational environment that is adequate for supporting the production of excellent research.
2	An organisational environment that is modest for supporting the production of excellent research.
1	An organisational environment that is not supportive for the production of excellent research.

Quality dimension

Score	Research and publication quality	Score	Research group's contribution Groups were invited to refer to the Contributor Roles Taxonomy in their description https://credit.niso.org/
5	Quality that is outstanding in terms of originality, significance and rigour.	5	The group has played an outstanding role in the research process from the formulation of overarching research goals and aims via research activities to the preparation of the publication.
4	Quality that is internationally excellent in terms of originality, significance and rigour but which falls short of the highest standards of excellence.	4	The group has played a very considerable role in the research process from the formulation of overarching research goals and aims via research activities to the preparation of the publication.
3	Quality that is recognised internationally in terms of originality, significance and rigour.	3	The group has a considerable role in the research process from the formulation of overarching research goals and aims via research activities to the preparation of the publication.
2	Quality that meets the published definition of research for the purposes of this assessment.	2	The group has modest contributions to the research process from the formulation of overarching research goals and aims via research activities to the preparation of the publication.
1	Quality that falls below the published definition of research for the purposes of this assessment.	1	The group or a group member is credited in the publication, but there is little or no evidence of contributions to the research process from the formulation of overarching research goals and aims via research activities to the preparation of the publication.

Societal impact dimension

Score	Research group's societal contribution, taking into consideration the resources available to the group	Score	User involvement
5	The group has contributed extensively to economic, societal and/or cultural development in Norway and/or internationally.	5	Societal partner involvement is outstanding – partners have had an important role in all parts of the research process, from problem formulation to the publication and/or process or product innovation.
4	The group's contribution to economic, societal and/or cultural development in Norway and/or internationally is very considerable given what is expected from groups in the same research field.	4	Societal partners have very considerable involvement in all parts of the research process, from problem formulation to the publication and/or process or product innovation.
3	The group's contribution to economic, societal and/or cultural development in Norway and/or internationally is on par with what is expected from groups in the same research field.	3	Societal partners have considerable involvement in the research process, from problem formulation to the publication and/or process or product innovation.
2	The group's contribution to economic, societal and/or cultural development in Norway and/or internationally is modest given what is expected from groups in the same research field.	2	Societal partners have a modest part in the research process, from problem formulation to the publication and/or process or product innovation.
1	There is little documentation of contributions from the group to economic, societal and/or cultural development in Norway and/or internationally.	1	There is little documentation of societal partners' participation in the research process, from problem formulation to the publication and/or process or product innovation.



The Research Council
of Norway

EVALBIOVIT

Self-assessment for administrative
units

Version 1.2

Overview

Institution (name and short name):

Administrative unit (name and short name):

Date:

Contact person:

Contact details (email):

1 Introduction

The primary aim of the evaluation is to reveal and confirm the quality and the relevance of research performed at Norwegian Higher Education Institutions (HEIs), and by the institute sector. For the life sciences area, research undertaken by regional health authorities and health trusts is also included. These institutions will henceforth be collectively referred to as research performing organisations (RPOs). The evaluation report(s) will provide a set of recommendations to the RPOs, the Research Council of Norway (RCN) and the concerned ministries. The results of the evaluation will also be disseminated for the benefit of potential students, users of research, and society at large.

You have been invited to complete this self-assessment as an administrative unit. The self-assessment contains questions regarding the unit's research- and innovation related activities and developments over the past 10 years. All the submitted data will be evaluated by evaluation committees (for administrative units) and expert panels (for research groups). Please read through the whole document including all instructions before answering the questions to avoid overlaps.

As an administrative unit, you are also responsible for collecting the completed self-assessment for each of the research groups that belong to the unit. The research groups need to submit their completed self- assessment to the unit no later than the 1st of December 2022. The unit will submit the research groups' completed self-assessments and the unit's own completed self-assessment no later than the 5th of December 2022.

The whole self-assessment shall be written in English.

Please use the following format when naming your document: name of the institution, and name of the administrative unit, e.g. UiO_FacBiosci. Send it to evalbiovit@technopolis-group.com no later than 5th of December 2022.

For questions concerning the self-assessment or EVALBIOVIT in general, please contact RCN's evaluation secretariat at Technopolis Group: evalbiovit.questions@technopolis-group.com.

Many thanks in advance!

¹ Personal information will be deleted when evaluation reports are published and no later than 30 April 2024

For more information on how Technopolis Group handles data processing, see: <http://www.technopolis-group.com/privacy-policy/>

For more information on how the Research Council of Norway handles data processing, see: <https://www.forskingsradet.no/en/privacy-policy/>

2 Self-assessment for administrative units

Self-assessment guidelines:

- Data on personnel should refer to reporting to DBH on 1 October 2021 for HEIs and to the yearly reporting for 2021 for the institute sector
- Other data should refer to 31 December 2021 if not specified otherwise
- Please read the entire self-assessment document before answering
- Provide information – provide documents and other relevant data or figures about the administrative unit, for example strategy and other planning documents, as well as data on R&D expenditure, sources of income and results and outcomes of research
- Describe – explain and present using contextual information about the administrative unit (most often this includes filling out specific forms) and inform the reader about the administrative unit
- Reflect – comment in a reflective and evaluative manner how the administrative unit operates
- 4000 characters including spaces equals one page

2.1 Strategy, resources and organisation of research

2.1.1 Research strategy

- 2.1.1.1 Describe the main strategic goals for research and innovation of the administrative unit (1000–4000 characters). How are these goals related to institutional strategies?
- Describe the main fields and focus of research and innovation in the unit
 - Describe how you work to maximise synergies between the different purposes of the unit
 - Describe the planned research-field impact; planned policy impact and planned societal impact
 - Describe how the strategy is followed-up in the allocation of resources and other measures
 - Describe the most important occasions where priorities are made (i.e., announcement of new positions, applying for external funding, following up on evaluations)
 - If there is no long-term research strategy – explain why

Form 1 Administrative unit's strategic planning documents

Instructions: For each category (Research strategy, Research funding, Cooperation policy, Open science policy) present up to 5 documents that according to you are the most relevant. If the administrative unit uses the strategies, policies, etc. of a larger institution, then present these documents. Please use the following formatting: Name of document, Years active, Link to the document.

Example: Norwegian University of Science and Technology Strategy, 2021–2025, [hyperlink to the document](#)

2.1.2 Organisation of research

- 2.1.2.1 Describe the organisation of research and innovation activities at the unit, including how responsibilities for research and other purposes (education, knowledge exchange, patient treatment, training etc) are distributed and delegated (500–1500 characters).

Form 2 SWOT analysis for administrative units

Instructions: Please complete a SWOT analysis for your administrative unit. Reflect on what are the major internal Strengths and Weaknesses as well as external Threats and Opportunities for your research and innovation activities and research environment. Assess what the present Strengths enable in the future and what kinds of Threats are related to the Weaknesses. Consider your scientific expertise and achievements, funding, facilities, organisation and management (500–2000 characters per cell).

2.1.3 Research funding

- 2.1.3.1 Describe the funding sources of the unit and indicate the share of the unit's budget (NOK) dedicated to research compared to other purposes. Shares may be calculated based on full time equivalents (FTE) allocated to research compared to total FTE in unit (500–1500 characters).
- 2.1.3.2 Describe how successful the administrative unit has been in obtaining competitive regional, national and/or international research funding grants (200–1000 characters).

Form 3 Funding levels for the administrative unit for 2021

Instructions: For administrative units in the institute sector receiving basic funding via RCN, funding levels should be provided for 2021 in the funding categories used in the yearly reporting:

- a) National grants (NOK) (post 1.1 og 1.2):
 - i) from the Research Council of Norway (NOK) – excluding basic funding
 - ii) from the ministries and underlying directorates (NOK)
 - iii) from industry (NOK)
 - iv) other national grants including third sector, private associations and foundations (NOK)
- b) National contract research (post 1.3)
- c) International grants (post 1.4)
- d) Funding related to public management (forvaltningsoppgaver post 1.5)

For Higher Education Institutions costs covered by external funding sources should be reported according to the same categories as far as possible. Costs may be classified as Other if they cannot be placed in one of the specified categories. Reporting should be based on incurred costs (regnskapstall) for 2021.

2.1.4 Participation in national infrastructures

- 2.1.4.1 Describe the most important participation in the national infrastructures listed in the Norwegian roadmap for research infrastructures (Nasjonalt veikart for forskningsinfrastruktur) including as host institution(s) (200–1000 characters).

Form 4 Infrastructures listed in the Norwegian roadmap for research infrastructures (Nasjonalt veikart for forskningsinfrastruktur)

Instructions: Please present up to 5 participations in the national infrastructures listed in the Norwegian roadmap for research infrastructures (Nasjonalt veikart for forskningsinfrastruktur) for each area that were the most important to your administrative unit. For each category area, please use the following formatting:

Name of research infrastructure, Years when used, Description (100–500 characters) of the engagement with the research infrastructure (reasoning, objectives, expected/actual outcomes).

² Excluding basic funding.

³ For research institutes only research activities should be included from section 1.3 in the yearly reporting

- 2.1.4.2 Describe the most important participation in the international infrastructures funded by the ministries (Norsk deltakelse i internasjonale forskningsorganisasjoner finansiert av departementene) (200–1000 characters).

Form 5 Participation in international research organisations

Instructions: Please describe up to 5 participations in international and European infrastructures (ESFRI) for each area that have been most important to your research unit. When presenting your participation, please use the following formatting:

Name of research infrastructure, Years when used, Description (100–500 characters) of the participation in the research infrastructure (reasoning, objectives, expected/actual outcomes).

2.1.4.3 Describe the most important participation in European (ESFRI) infrastructures (Norske medlemskap i infrastrukturer i ESFRI roadmap) including as host institution(s) (200–1000 characters).

Form 6 Participation in infrastructures on the ESFRI Roadmap

Instructions: For each area, please give a description of up to 5 engagements that have been most important to your research unit. When presenting your participation, please use the following formatting: Name of research infrastructure, Years when used, Description (100–500 characters) of the engagement with the research infrastructure (reasoning, objectives, expected/actual outcomes)."

2.1.5 Accessibility to research infrastructures

2.1.5.1 Describe the accessibility to research infrastructures for your researchers. Considering both physical and electronic infrastructure (200–1000 characters).

2.1.5.2 Describe what is done at the unit to fulfil the FAIR-principles⁴ (200–1000 characters).

2.1.6 Research staff

2.1.6.1 Describe the profile of research personnel at the unit in terms of position and gender (200–1000 characters).

Form 7 Administrative data on the division of staff resources for 2021

2.1.6.2 Describe the structures and practices to foster researcher careers and help early-career researchers to make their way into the profession (200–1000 characters).

2.1.6.3 Describe how research time is distributed among staff including criteria for research leave (forskningsfri) (200–1000 characters).

2.1.6.4 Describe research mobility options (200–1000 characters).

2.2 Research production, quality, and integrity

2.2.1 Research quality and integrity

2.2.1.1 Describe the scientific focus areas of the research conducted at the administrative unit, including the unit's contribution to these areas (500–2000 characters).

2.2.1.2 Describe the unit's policy for research integrity, including preventative measures when integrity is at risk, or violated (200–1000 characters).⁵

2.2.2 Open Science policies at the administrative unit

2.2.2.1 Describe the institutional policies, approaches, and activities to the following Open Science areas (consider each area separately, 500–1000 characters in total):

- Open access to publications
- Open access to research data and implementation of FAIR data principles
- Open-source software/tools
- Open access to educational resources
- Open peer review
- Skills and training for Open Science
- Citizen science and/or involvement of stakeholders / user groups

2.2.2.2 Describe the most important contributions and impact of the unit's researchers towards the different Open Science areas (consider each area separately, 500–1000 characters in total):

- Open access to publications
- Open access to research data and implementation of FAIR data principles
- Open-source software/tools
- Open access to educational resources
- Open peer review
- Skills and training for Open Science
- Citizen science and/or involvement of stakeholders/user groups

2.2.2.3 Describe the institutional policy regarding ownership of research data, data management, and confidentiality (200–1000 characters). Is the use of data management plans implemented at the unit?

2.3 Diversity and equality

2.3.1 Diversity and equality practices

2.3.1.1 Describe the policy and practices to protect against any form of discrimination in the administrative unit (200–1000 characters).

Form 8 Administrative unit's policies against discrimination

Instructions: Give a description of up to 5 documents that are the most relevant. If the administrative unit uses the strategies, policies, etc. of a larger institution, then these documents should be referred to. For each document use the following formatting: Name of document, Years active, Link to the document

Example: Norwegian University of Science and Technology Strategy, 2021–2025, [hyperlink to the document](#)

2.4 Relevance to institutional and sectorial purposes

2.4.1 Sector specific impact

2.4.1.1 Describe whether the administrative unit has activities aimed at achieving sector-specific objectives⁶ or focused on contributing to the knowledge base in general. Describe activities connected to sector-specific objectives, the rationale for participation and achieved and/or expected impacts (500–3000 characters).

- Alternatively, describe whether the activities of the unit are aimed at contribution to the knowledge base in general. Describe the rationale for this approach and the impacts of the unit's work to the knowledge base.

2.4.2 Research innovation and commercialisation

2.4.2.1 Describe the administrative unit's practices for innovation and commercialisation (500–1500 characters).

- Describe the interest among the research staff in doing innovation and commercialisation activities
- Describe how innovation and commercialisation is supported at the unit

Form 9 Administrative unit's policies for research innovation

Instructions: Describe up to 5 documents of the administrative unit's policies for research innovation, including IP policies, new patents, licenses, start-up/spin-off guidelines, etc., that are the most relevant. If the administrative unit uses the strategies, policies, etc. of a larger institution, then present these documents. For each document use the following formatting: Name of document, Years active, Link to the document

Example: Norwegian University of Science and Technology Strategy, 2021–2025, [hyperlink to the document](#)

2.4.2.2 Provide examples of successful innovation and commercialisation results, such as new patents, licenses, etc (500–1500 characters).

Form 10 Administrative description of successful innovation and commercialisation results

Instructions: Please describe up to 10 successful innovation and commercialisation results at your administrative unit. For each result, please use the following formatting: Name of innovation and commercial results, Year, Links to relevant documents, articles, etc. that present the result, Description (100–500 characters) of successful innovation and commercialisation result.

2.4.3 Collaboration

2.4.3.1 Describe the unit's policy towards regional, national and international collaboration, as well as how cross-sectorial collaboration and interdisciplinary collaboration is approached at the administrative unit (500–1500 characters). Please fill out the forms that match your institution: the institute sector fills out Form 11a and Form 11b; HEIs fill out Form 12.

- Reflect on how successful the unit have been in meeting its aspirations for collaborations

Form 11a (institute sector) Administrative unit's partnerships ('faktisk samarbeid')

Instructions: For each of the administrative unit's tender and project-based cooperation (which are not tax deducted) please present up to 5 examples under each category (Collaboration with national public institutions; Collaboration with national private institutions; Collaboration with international public institutions; Collaboration with international private institutions). Please use 100– 500 characters to describe the impacts and relevance of collaboration.

Form 11b (institute sector) Administrative unit's collaboration

Instructions: For each of the administrative unit's tender and project-based cooperation please present up to 5 examples under each category (Collaboration with academic partners nationally; Collaboration with non-academic partners nationally; Collaboration with academic partners internationally; Collaboration with non-academic partners internationally). Please use 100–500 characters to describe the impacts and relevance of collaboration.

2.4.3.2 Reflect on the importance of different types of collaboration for the administrative unit (200–1000 characters).

- Regional, national and international collaborations
Collaborations with different sectors, including public, private and third sector

Form 12 (HEIs) Administrative unit's partnerships" ('faktisk samarbeid')

Instructions: For each of the administrative unit's tender and project-based cooperation (which are not tax deducted) please present up to 5 examples under each category (Collaboration with national public institutions; Collaboration with national private institutions; Collaboration with international public institutions; Collaboration with international private institutions). Please use 100– 500 characters to describe the impacts and relevance of collaboration.

2.4.3.3 Reflect on the importance of different types of collaboration for the administrative unit, the added value of these collaborations to the administrative unit and Norwegian research system (500–1500 characters).

2.4.4 ONLY for higher education institutions

- 2.4.4.1 Reflect on how research at the unit contributes towards master and PhD-level education provision, at your institutions and beyond (200–1000 characters).⁷
- 2.4.4.2 Describe the opportunities for master and bachelor students to become involved in research activities at the unit (200–1000 characters).

2.4.5 ONLY for research institutes

- 2.4.5.1 Describe how the research activities at the administrative unit contribute to the knowledge base for policy development, sustainable development, and societal and industrial transformations more generally (500–1500 characters).⁸
- 2.4.5.2 Describe the most important research activities including those with partners outside of research organisations (500–1500 characters).

2.5 Relevance to society

2.5.1 Administrative unit's societal impact

- 2.5.1.1 Reflect on the unit's contribution towards the Norwegian Long-term plan for research and higher education, societal challenges more widely, and the UN Sustainable Development Goals (500–1500 characters).
- 2.5.1.2 Describe how the administrative unit's research and innovation has contributed to economic, societal and cultural development by submitting one to five impact cases depending on the size of the unit. For up to 10 researchers: one case; for 10 to 30 researchers: two cases; for 30-50 researchers: three cases; for 50-100 researchers: four cases, and up to five cases for units exceeding 100 researchers. Please use the attached template for impact cases. Each impact case will be submitted as an attachment to the self-evaluation. Institutions that submit impact cases do not have to fill in the box below.

Case no. 1

Thank you for completing the self-assessment.

⁷ Please note: RCN will provide data from the national student survey (Studiebarometeret) on students' experience with research methods and exposure to research activities. The data will most probably be on an aggregate level but including the unit under assessment.

⁸ Strategi for helhetlig instituttpolitikk, Kunnskapsdepartementet, p.4): «Instituttsektoren skal utvikle kunnskapsgrunnlag for politikktutforming og bidra til bærekraftig utvikling og omstilling, gjennom forskning av høy kvalitet og relevans.» ([The government's strategy for an independent institute sector](#)).

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